

TORQUE SENSOR

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Abstract

PROBLEM TO BE SOLVED: To reduce manufacturing cost without causing a trouble, e.g. significant deterioration of performance.

SOLUTION: Rotary shafts, i.e., input and output shafts 1, 2, arranged coaxially and rotatably are coupled through a torsion bar 3. The input and output shafts 1, 2 are made of a general structural steel, e.g. S25C or S35C, which is a conductive magnetic body and coated with a thin film of Ni-P alloy by electroless nickel plating. A torque acting on the input and output shafts 1, 2 is detected as a variation of electromotive force being induced in coils 10, 11 through relative rotation involving torsion of the torsion bar 3.

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[0045] Moreover, if plating processing is performed so that it may be tintured with such magnetism since it is a strong ferromagnetic like [pure nickel] iron although the nickel-P alloy formed of non-electrolyzed nickel plating does not have magnetism since 8% or more of thing has the amorphous Lynn content, and non-electrolyzed nickel plating also comes to be tintured with heat treatment temperature the order of 250 degrees C to magnetism, and a coat is formed, sensor sensitivity will come to improve rather than the case of a structural-steel simple substance. That is, although carbon is included in large quantities in order that a structural steel may raise the mechanical strength, since there is work which weakens iron magnetism in carbon, compared with SUS material, the relative permeability of a structural steel will be small and the part sensor sensitivity will fall. However, if the coat of the front face of the input shaft 1 which consists of a structural steel, and an output shaft 2 is carried out by the nickel alloy tintured with magnetism as mentioned above, since the nickel component in the coat comes to compensate a part for the magnetic fall by carbon, sensor sensitivity will improve rather than the case of a structural-steel simple substance.